What is claimed is:

1. An image forming apparatus arranged to determine an amount of toner adhered to a predetermined subject region of calculation in a surface of an image carrier, comprising:

an optical sensor which irradiates light on a smaller measurement area than said subject region of calculation for receiving light therefrom, and which outputs a signal corresponding to an amount of received light; and

control means which acquires N1 (N1 being a natural number of 2 or more) sample data pieces by sampling output signals from said optical sensor with respect to said measurement areas present at different N1 places in said subject region of calculation and determines the amount of toner adhered to said subject region of calculation based on N2 sample data pieces out of said N1 sample data pieces (N2 being a smaller natural number than N1).

2. An image forming apparatus as claimed in Claim 1, wherein said control means performs a noise elimination process for removing a predetermined number of data pieces of higher order and/or of lower order from said N1 sample data pieces, thereby obtaining said N2 sample data pieces.

3. An image forming apparatus as claimed in Claim 2,

wherein said control means determines the amount of toner adhered to said subject region of calculation based on an average value of said N2 sample data pieces.

4. An image forming apparatus as claimed in Claim 2, wherein said control means replaces each of the removed (N1-N2) sample data pieces with the average value of said N2 sample data pieces, and determines the amount of toner adhered to said subject region of calculation based on said N1 data pieces including said (N1-N2) data pieces thus replaced and said N2 sample data pieces.

5. An image forming apparatus as claimed in Claim 2, wherein said control means controls image density by forming, as a patch image, a toner image of a predetermined pattern on said image carrier; calculating the amount of toner adhered to said subject region of calculation defined by at least a part of said patch image; and then based on the calculation result, adjusting a control factor affecting the image density.

6. An image forming apparatus as claimed in Claim 5, wherein said control means performs said sampling and noise elimination processes on said subject region of calculation in respective states where the patch image is borne on said image carrier and where said image carrier bears no patch image thereon, and determines the amount of toner

adhered to said subject region of calculation within said patch image based on the results of these processes.

7. An image forming apparatus as claimed in Claim 6, wherein the sample data piece removed by said control means performing the noise elimination process on the sample data pieces acquired from the patch image borne on said image carrier is related to the same measurement area that corresponds to the sample data piece removed by said control means performing the noise elimination process on the sample data pieces acquired from said image carrier bearing no patch image thereon.

8. An image forming apparatus as claimed in Claim 5, wherein said image carrier is arranged to rotate in a predetermined direction, and

wherein said control means forms the patch image which has a greater length than a circumferential length of said image carrier with respect to said predetermined direction and in which said subject region of calculation has substantially an equal length to the circumferential length of said image carrier with respect to said predetermined direction.

9. A toner-adhesion calculation method for determining an amount of toner adhered to a predetermined subject region of calculation in a surface of an image carrier comprising the steps of:

irradiating light on a smaller measurement area than said subject region of calculation for receiving light therefrom; acquiring N1 sample data pieces by sampling signals corresponding to amounts of received light; and determining the amount of toner adhered to said subject region of calculation based on N2 sample data pieces out of said N1 sample data pieces (N2 being a smaller natural number than N1).

10. A toner-adhesion calculation method as claimed in claim 9, wherein said N2 sample data pieces are obtained by performing a noise elimination process wherein a predetermined number of data pieces of higher order and/or of lower order are removed from said N1 sample data pieces.

11. A data processing method for determining an amount of toner adhered to a predetermined subject region of calculation in a surface of an image carrier comprising the steps of:

irradiating light on a smaller measurement area than said subject region of calculation for receiving light therefrom; acquiring N1 sample data pieces by sampling signals corresponding to amounts of received light; removing a predetermined number of data pieces of higher order and/or lower order from said N1 sample data pieces; and using the remaining N2 sample data pieces as valid data for calculating the amount of toner adhered to said subject region of calculation.

12. An image forming apparatus arranged to determine an amount of toner adhered to a predetermined subject region of calculation in a surface of an image carrier, comprising:

an optical sensor which irradiates light on a measurement area in the surface of said image carrier for receiving light therefrom, and which outputs a signal corresponding to an amount of received light; and

control means which acquires sample data pieces by sampling output signals from said optical sensor with respect to individual measurement areas, regarding each of said subject region of calculation and its plural neighboring regions as said measurement area, and which determines the amount of toner adhered to said subject region of calculation based on the sample data pieces.

13. An image forming apparatus as claimed in Claim 12, wherein said control means determines the amount of toner adhered to said subject region of calculation based on the sample data pieces on (M1+M2+1) measurement areas including said subject region of calculation and said measurement areas at M1 places upstream therefrom along the predetermined direction (M1 being a natural number) and at M2 places downstream therefrom along said predetermined direction (M2 being a natural number).

14. An image forming apparatus as claimed in Claim 13, wherein said control means determines the amount of toner adhered to said

subject region of calculation based on a median of the sample data pieces on the measurement areas at said (M1+M2+1) places, provided that said M1 and M2 are at an equal numerical value.

15. An image forming apparatus as claimed in Claim 12, wherein said control means forms, as a patch image, a toner image of a predetermined pattern on said image carrier; calculates the amount of toner adhered to said subject region of calculation within said patch image; and then, based on the calculation result, adjusts a control factor affecting image quality.

16. An image forming apparatus as claimed in Claim 15, wherein said control means performs the sampling on said subject region of calculation and a predetermined number of its neighboring measurement areas in respective states where said patch image is borne on said image carrier and where said image carrier bears no patch image thereon; determines a respective median of these sample data sets; and then determines the amount of toner adhered to said subject region of calculation based on the median determined for the state where said patch image is borne on said image carrier and the median determined for the state where said image carrier bears no patch image thereon.

17. An image forming apparatus as claimed in Claim 13, wherein said control means forms a toner image as a patch image on said

image carrier, said patch image varied in the tone level thereof along the predetermined direction; calculates respective amounts of toner adhered to the plural subject regions of calculation arranged in said patch image at different positions along said predetermined direction; and then, performs tone correction of the apparatus based on the calculation results.

18. An image forming apparatus as claimed in Claim 17, wherein said control means performs the sampling on said subject region of calculation and the predetermined number of its neighboring measurement areas in respective states where said patch image is borne on said image carrier and where said image carrier bears no patch image thereon; determines a respective median of these sample data sets; and determines the amount of toner adhered to said subject region of calculation based on the median determined for the state where said patch image is borne on said image carrier and the median determined for the state where said image carrier bears no image thereon.

19. An image forming apparatus as claimed in Claim 18, wherein a number of sample data pieces used for determining the median for the state where said image carrier bears no patch image thereon is greater than a number of sample data pieces used for determining the median for the state where said patch image is borne on said image carrier.

20. An image forming apparatus as claimed in Claim 13,

wherein said (M1+M2+1) measurement areas are arranged with equal spacing along said predetermined direction.

21. An image forming apparatus as claimed in Claim 20, wherein said control means performs the sampling at regular time intervals as moving said image carrier at a given speed along said predetermined direction, thereby acquiring the sample data pieces on said (M1+M2+1) measurement areas.

22. A toner-adhesion calculation method for determining an amount of toner adhered to a predetermined subject region of calculation in a surface of an image carrier comprising the steps of:

irradiating light on individual measurement areas for receiving light therefrom, regarding each of said subject region of calculation and its plural neighboring regions as said measurement area; acquiring sample data pieces by sampling signals corresponding to amounts of received light from said individual measurement areas; and determining the amount of toner adhered to said subject region of calculation based on the sample data pieces.

23. A data processing method for determining an amount of toner adhered to a predetermined subject region of calculation in a surface of an image carrier comprising the steps of:

irradiating light on (2M1+1) measurement areas for receiving light

therefrom, said measurement areas including said subject region of calculation and areas at M1 places (M1 being a natural number) upstream from said subject region along a predetermined direction and at M1 places downstream therefrom along said predetermined direction; acquiring sample data pieces by sampling signals corresponding to amounts of received light; replacing the sample data piece on said subject region of calculation with a median of said (2M1+1) sample data pieces; and using the replaced data piece as valid data for calculating the amount of toner adhered to the subject region of calculation.